What is claimed is:

1. A device (10) for thermal imaging of target surface(s) having different temperatures within a range of temperatures of interest between a high and low temperature of -40°C to 2000°C, the thermal imaging taking place through intervening media having a known transmission wavelength, the target surface(s) having a known absorptive wavelength, comprising:

(a) a housing (12) including an opening (14) for admitting infrared rays including those emanating from said target surface(s), said rays directed along an optical path within said housing, said optical path having an optical axis (38);

(b) an optical assembly (40) positioned within said housing and in said optical path, said optical assembly having an input and an output, said infrared rays directed towards and into said input, through and out of said output of said optical assembly;

(c) means for optimizing the spectral band width of said optical assembly to 3um to 14um;

(d) an un-cooled focal plane array, infrared ray detector(UFPA detector) (48) including a detecting surface (86), said UFPA detector positioned in said housing and in said optical path so as to allow the impingement of the infrared rays passing out of said optical assembly onto said detecting surface;

(e) means(84) for optimizing the spectral band width of said UFPA detector to 3um to 14 um;,

said UFPA detector providing an electrical output proportional to the energy of the infrared rays impinging onto said detecting surface;

(f) filter means (44) including a first (78) and second (80) infrared band pass filter, said first infrared band pass filter having a spectral band width of 8 to 14um, said second infrared band pass filter having a respective spectral band width within 3 to 8um, each of said band pass filters removably interposed in said optical path upon direction of an operator for filtering the infrared rays entering the housing so as to attenuate certain infrared rays and to pass other infrared rays of particular, respective predetermined wavelengths associated with said range of temperatures of interest, the transmission wavelength of the intervening media and the absorptive wavelength of the target surface(s); and,

(g) electronic means adapted to convert said electrical output into at least one interpretable output (26, 28, 30, 32, 72) whereby an operator is presented with information

sufficient to determine the temperature(s) of the target surface(s) within an acceptable degree of accuracy.

(2) The device claimed in claim 1 wherein said optical assembly includes an objective lens (74), a negative lens (76), and focusing lens means (18, 82, 84).

(3) The device claimed in either claim 1 or claim 2 wherein, each of said lenses is made of germanium.

(4) The device claimed in either claim 1 or claim 2 wherein said means for optimizing the spectral band width of said optical assembly to 3um to 14um includes each lens having an anti-reflection coating with a spectral band width of 3um to 14um.

(5) The device claimed in claim 3 wherein said means for optimizing the spectral band width of said optical assembly to 3um to 14um includes each lens having an anti-reflection coating with a spectral band width of 3um to 14um.

(6) The device claimed in either claim 1 or claim 2 wherein said means (84) for optimizing the spectral band width of said UFPA detector to 3um to 14 um includes a spectral transmission window (84) positioned in said optical path between said output and said detecting surface, said spectral transmission window having a spectral band width of 3um to 14um.

(7) The device claimed in claim 3 wherein said means(84) for optimizing the spectral band width of said UFPA detector to 3um to 14 um includes a spectral transmission window (84) positioned in said optical path between said output and said detecting surface, said spectral transmission window having a spectral band width of 3um to 14um.

(8) The device claimed in claim 4 wherein said means(84) for optimizing the spectral band width of said UFPA detector to 3um to 14 um includes a spectral transmission window (84) positioned in said optical path between said output and said detecting surface, said spectral transmission window having a spectral band width of 3um to 14um.

(9) The device claimed in claim 5 wherein said means(84) for optimizing the spectral band width of said UFPA detector to 3um to 14 um includes a spectral transmission window (84) positioned in said optical path between said output and said detecting surface, said spectral transmission window having a spectral band width of 3um to 14um.

(10) The device claimed in claim 1 wherein the thermal imaging of target surface(s) can occur in sunlight when said first infrared band pass filter is interposed in said optical path.

(11) The device claimed in claim 1 wherein the spectral band width of said second band pass filter is 3.8 to 4.0um.

(12) The device claimed in claim 1 wherein the spectral band width of said second band pass filter is 4.8 to 5.2um.

(13) The device claimed in claim 1 wherein the spectral band width of said second band pass filter is 6.7 to 6.9um.

(14) A device (10) for thermal imaging of target surface(s) having different temperatures within a range of temperatures of interest between a high and low temperature of -40°C to 2000°C, the thermal imaging taking place through intervening media having a known transmission wavelength, the target surface(s) having a known absorptive wavelength, comprising:

(a) a housing (12) including an opening (14) for admitting infrared rays including those emanating from said target surface(s), said rays directed along an optical path within said housing, said optical path having an optical axis (38);

(b) an optical assembly (40) positioned within said housing and in said optical path, said optical assembly having an input and an output, said infrared rays directed towards and into said input, through and out of said output of said optical assembly; said optical assembly including an objective lens (74), a negative lens (76), and focusing lens means (18, 82, 84), each of said lenses made of germanium and having an anti-reflection coating with a spectral band width of 3um to 14um;

(c) an un-cooled focal plane array, infrared ray detector(UFPA detector) (48) including a detecting surface (86), said UFPA detector positioned in said housing and in said optical path so as to allow the impingement of the infrared rays passing out of said optical assembly onto said detecting surface, said UFPA detector further including a spectral transmission window (84) positioned in said optical path between said output and said detecting surface, said spectral transmission window having a spectral band width of 3um to 14um;

said UFPA detector providing an electrical output proportional to the energy of the infrared rays impinging onto said detecting surface;

(d) filter means (44) including a first (78) and second (80) infrared band pass filter, said first infrared band pass filter having a spectral band width of 8 to 14um, said second infrared band pass filter having a respective spectral band width within 3 to 8um, each of said band pass filters removably interposed in said optical path upon direction of an operator for filtering the infrared rays entering the housing so as to attenuate certain infrared rays and to pass other infrared rays of particular, respective predetermined wavelengths associated with

said range of temperatures of interest, the transmission wavelength of the intervening media and the absorptive wavelength of the target surface(s); and,

(e) electronic means adapted to convert said electrical output into at least one interpretable output (26, 28, 30, 32, 72) whereby an operator is presented with information sufficient to determine the temperature(s) of the target surface(s) within an acceptable degree of accuracy.

(15) The device claimed in claim 14 wherein the thermal imaging of target surface(s) can occur in sunlight when said first infrared band pass filter is interposed in said optical path.

(16) The device claimed in claim 14 wherein the spectral band width of said second band pass filter is 3.8 to 4.0um.

(17) The device claimed in claim 14 wherein the spectral band width of said second band pass filter is 4.8 to 5.2um.

(18) The device claimed in claim 14 wherein the spectral band width of said second band pass filter is 6.7 to 6.9um.